Workload Reporting

Processing and Reporting Logic

October 26, 2001

Rev 1.1

Contents

Workload Processing

1. Overview of Workload Processing

NPIRS provides workload reporting to facilitate Area agreement with the data after it has been received and processed. Workload refers to visits that are determined to be valid according to established criteria by visit type. Area Statistical Officers compare the NPIRS workload reports to reports they generate from their own local data repositories using the PCC Management Reporting module. Communication between NPIRS and the Area Statistical Officers, based on that comparison, can result in adjustments to the data and ultimately to approval of the data by the Areas. For the past few years, approval of valid workload data by all the Areas has been a prerequisite to the annual generation of user population reports that depend upon the workload data to determine 'active/non-active' status of patients.

Workload processing begins with receipt of visit export files and ends with generation of workload reportable visit reports by type of visit. The majority of export files currently are generated at IHS sites by the RPMS Primary Care Component export software module, by the Contract Health Management Information system export functionality, and by the RPMS Dental software. The files are sent to NPIRS most commonly by FTP transmission.

Several different programs process the different export files received by NPIRS, performing checks on the data, checking for duplicates, linking the visit files to patients, determining workload reportability based on established criteria, and inserting the data into tables specific to visit type. Crystal Reports software is then used to generate reports based on visit type which are available to users via the NPIRS website. There are several update programs that process the export files, including individual processing procedures required for direct tribal exports. This document addresses only the major export handling programs, which account for the vast majority of data received by NPIRS. The major exports include those generated from the Patient Care Component (PCC), Contract Health Management Information System (CHS), the CHS Fiscal Intermediary, and the Dental software applications.

2. Export File Handling

IHS Areas receive visit files from their sites, consolidate them into export files using the RPMS Area Data Consolidation System (AIB) software, and FTP those files to a subdirectory under the public directory *(/usr/spool/uucppublic[Area host server name]*) on NPIRS Server 1 (*ircsrv1*).

The *movedata.sh* shell script, running daily every 5 minutes, scans the public directory for new files. When it finds one, it picks up the filename and counts the number of records it contains. It then checks the Email Table for contact personnel in the source Area and sends an email to them with a copy to the NPIRS Program Owner and the NPIRS Help Desk. The email contains the filename, the number of records received in the file, and the date of FTP transmission.

- If the script finds a file it doesn't recognize, it places it in the public directory at the root level. The same email notification system informs the NPIRS Program Owner who handles it manually.

- If the script finds a duplicate file, it places it in the public directory at the root level and sends an email to the source Area (copying the NPIRS Program Owner and the NPIRS Help Desk) asking the Area contact(s) what they want done with the file.

The script opens the file and removes carriage returns (found in files received from NT systems) because the NPIRS system truncates data following these returns.

- When the script finds a Mental Health file (*mhsrun*), it moves it to the SAS subdirectory.

- When the script finds non-NPIRS files (i.e., CHR and CDMIS), it moves them to the public directory at the root level and generates the email notification to the sending source and NPIRS (NPIRS Program Owner, Help Desk).

  a) CDMIS Files: The NPIRS Program Owner manually moves these files to the RPMS Mumps database (*vpssyg*) and notifies the Behavioral Health program in Rockville.

  b) CHR Files: The NPIRS Program Owner manually runs a program that encrypts and password protects the file, then emails it to Frontier Consulting.

The *movedata.sh* script then moves the FTP files to the *area_data_import* directory on the same NPIRS server (*ircsrv1*).

The *ninput_data.sh* script, running from NPIRS Server 2 (*irsrv2*), updates the input_files table on *ircsrv2* from the *area_data_import* directory on *ircsrv1* with filename, number of records, and date the file was received. The *ninput_data* script runs daily in 3-hour intervals from 6AM to 3PM and again at 8PM.

This script reads every file on the *area_data_import* directory and makes sure it is on the Input_files Table. If not, it moves it over to the Input_files Table and makes an entry in the Input_File_Data log for that file that includes the number of records moved. It also sends a message to the Help Desk in the event of an error.

When the *ninput_data* program places the export files in the Input_files Table on ircsrv2, it changes the Date Processed field value, if necessary, to null in each record. This null value in the

Date Processed field is one of the keys used later by the update program query to determine which files in the Input_files Table are new and have not been processed.

When the script finds a PCC export (*apcrun*), it also executes a COBOL program that creates a flat file for ORYX, moves it to the ORYX directory (SAS area), and sends an email to ORYX program staff.

3. Export File Processing Logic

3.1 Common Update Processing

The following programs query the Input_Files Table on *ircsrv2*, process visit records, and insert them to specific database tables or modify existing records in those tables:

- **npcc_upd** processes PCC Export files containing Ambulatory (APC), Inpatient, Contract Health Inpatient, Contract Health Outpatient, and Dental visit records.
- **bchs_upd** processes CHS Inpatient, Outpatient, and Dental visit records that contain dates with 2-digit years.
- **bchs_Y2kupd** processes CHS Inpatient, Outpatient, and Dental visit records that contain dates with 4-digit years.
- **nchsfi_upd** processes CHS Inpatient and Outpatient visit records exported to IHS from the CHS Financial Intermediary.
- **nden_upd** processes Dental visit records sent from the RPMS Dental application as other dental exports.

These update programs edit specific fields in each record, determine duplicate records, and determine whether the visit is workload reportable. These processes differ among the update programs and are thus described individually in this section below. However, the following two sets of logic are used by most or all of the update programs:

Duplicate Flag: Most update programs use the following logic to handle the duplicate flag in a visit record after checking that record with criteria used to determine a duplicate record:

- If a match is not found using the stated criteria, the new record is inserted with the Dup_flag set to "N."
- If a match is found and the Dup_flag of the existing record is equal to "N," the existing record is overwritten with the new record and its Dup_flag is set to "N."

Example:

Existing Record #1: Dup_flag = "N"
Existing Record #2: Dup_flag = "Y"
Existing Record #3: Dup_flag = "Y"

The program overwrites record #1 with the new record and sets its Dup_flag to "N."

Linker Logic: Each update program launches a 'linker' program that attempts to link the visit with a patient using the following common logic:

The *'linker'* program attempts to link each visit to a patient using the Chart Number in the visit record, as follows:

- If the Chart Number is all 9s: The program uses the first two characters of the ASUFAC in the visit record and pulls the Region Code from the R_region Table. It then checks the Patient Table for a record that exists with the same Region Code and SSN. If found, the program pulls the corresponding Patient ID and

inserts it into to the visit record. If it does not find the ASUFAC and SSN in the Patient table, the program sets the visit record Patient ID to "XXXXXXXXX."

- If the Chart Number is not all 9s: The program first looks in the Chart Table for the ASUFAC and Chart Number on the visit record. If it finds them there, the programs pulls the corresponding Patient ID and inserts it to the visit record. If it does not find the ASUFAC and Chart Number in the Chart Table, it looks at the Patient Table using the Region Code and SSN. If it does not find a match, the program sets the visit record Patient ID to "XXXXXXXXX."

Anytime a SSN is either blank or contains all spaces, the patient ID is set to all Xs. ***Approved Change***: Any use of SSN in a linking process will also attempt to match on Year of Birth and Gender. The SSN must also not be in a list of known invalid SSNs.

When a visit record is not linkable to a patient, it is counted as workload, but it is not used to determine active user population counts.

Refer to **Appendix A** for process flows for each of these programs and refer to **Appendix B** for a matrix that shows to which NPIRS table visit records are stored based on Type and Service Category values.

3.2 RPMS PCC Export File Update Processing (npcc_upd)

As an update program, ***npcc_upd*** validates, edits, and performs simple conversions on PCC export file data to prepare it for the various reporting processes that interpret it. This program queries the Input_Files Table on *ircsrv2* for files containing "apcrun" in the filename and a null processing date. When it finds such a file, it opens it and performs the following processes with the data:

NOTE: The acceptable record identifiers are AD1 (visit record) and AD4 (CPT codes) only. The AD2 and AD3 records are concatenated onto the AD1 record to complete one record type labeled as AD1. The AD4 record contains the CPT codes for the AD1 record which it follows. An unlimited number of AD4 records may follow any AD1 record.

AD1 Record Edits

The program finds AD1 (visit) records and breaks them out into individual fields (e.g., ASUFAC, Chart #, etc.). Then it performs, for the fields listed below, the edit(s) indicated for each:

1. **Region Code**: The program determines region using the first two characters of the ASUFAC and a mapping of Area to Region hard-coded in the program.

2. **ICD Code**: If the ICD code exists but the Recode field is blank, the program retrieves the recode value from the r_icd9_apc_recode table using the ICD Code and inserts the recode value to the record.

3. **Date Validation**: The program validates all dates in each record (e.g., date of service, date of birth) as being valid calendar dates. Any date found to be invalid (e.g., month 13, blank field, 31 days in a 30-day month) is replaced with a default date of 1/1/5000.

4. **Alaska ASUFAC/Location of Encounter**: Every record from Alaska is converted to an Area Code of 35 if it arrives with an Area Code of 30, with one facility exception: If Facility 303101 comes in as 303101 on or beyond 1/1/99, it is converted to 353101. If this facility comes in as 353101 on or before 12/31/98, it is converted to 303101.

5. **Clinic Code Conversion**: Since clinic code is required for workload reportable determination, any blank clinic code field is converted to XX which is counted as reportable.

6. **Cause of Injury Conversion**: Up to 9 causes of injury can be included in each record. (Note: Fields for the 9th occurrence of cause of injury is not on the existing PCC format and being corrected via Patch 5.) For each cause of injury three fields are edited:

   - Cause of Injury: This field originally contains an entry in the form E###.#. The program converts this entry to E####, dropping the decimal place.
   - Place of Injury: The old format carried a 2-digit (1-12) entry to this field; it now requires an alpha character (A-L). The program converts the numeric entry to the alpha entry using a map hard-coded within the program.
   - Diagnostic ICD: This field comes in with a decimal place in the entry. The program removes it.

7. **Procedure ICD**: This field comes in with a decimal place in the entry. The program removes it.

8. **Cause of Death**: This entry comes in the form ###.##. The program removes the 4th character, presumably always the decimal point and concatenates the remaining five characters.

9. **ASUFAC and Location of Encounter**: If the Location of Encounter field value is 657301 and the discharge date (preferred for Direct Inpatient) or admission date (on CHS Inpatient visit) is on or prior to 10/1/99, the program changes the value to 656301.

10. **Disposition Code**: The program populates this field with the Discharge Type if the record is for an inpatient visit or with an Emergency Room disposition if it is for an outpatient visit.

11. **Inpatient Days** (Inpatient Service Type only): The inpatient visit record contains fields for the Admission Date, Discharge Date, and Total Number of Days (i.e., length of stay). If either one of the dates is invalid (e.g., February 30) and has thus been replaced with the default date (01/01/5000), the program uses the value in the Total Days field. If both dates are valid, the program subtracts the value in the Admission Date field from the value in the Discharge Date field to determine the Number of Days value.

12. **CHS Cost**: If the record contains CHS cost information, the program makes it COBOL readable.

13. **Audit Trail Logic**:

    - If the program is inserting a new record, it puts the filename into the *source_new* field.
    - It inserts the date when the record was first ftp'd (from input_file) to the *source_date* field. (Note that this entry would apply to implementation of new cutoff logic.)
    - Receipt of a duplicate record is logged with the date the file was received (from the input_files table) and the name of the file containing the record in the *last_modified_source* field.

The *npcc_upd* program now determines into which table each entry should be inserted using values in the Visit Type and Service Category fields according to the **Table Insertion Matrix** in *Appendix B.* Notice two things about this matrix:

- The table called "Other_PCC_Data" contains those visits with a Type and Service Category combination that are not now or ever expected to be workload reportable. This table serves as storage for these visit records.
- Some table entries are inserted but flagged as non-workload reportable. This notation means that those Type and Service Category combinations are not currently workload reportable but may become so in the future. The only exception is that direct, not-found visits (Type= "I, T, O, 6, P, or U" and Service Category "N") are counted as workload reportable on the PHN reports.

The *npcc_upd* program now processes entries to each table individually, so further processing logic is defined separately by table.

APC Table Inserts

The *npcc.upd* program first determines if each APC visit is a duplicate of a record already in the APC Table; second, it attempts to link the visit to a patient; third, it determines if the visit in each record is workload reportable; and fourth, it then inserts the record to the table.

Determining and Handling Duplicate Records

The following criteria are used to determine whether or not a direct APC visit is a duplicate and flags it accordingly as either "Y" or "N" using the following criteria:

If the Chart Number is not equal to all 9s, the program compares visits using the following field values:

- ASUFAC
- Chart Number
- Date of Service
- Clinic Code
- Provider Code
- Location of Encounter
- Duplicate Flag: See Section 3.1, Common Update Processing.

If the Chart Number is equal to all 9s, the program compares visits using the SSN instead:

- ASUFAC
- SSN
- Date of Service
- Clinic Code
- Provider Code
- Location of Encounter
- Duplicate Flag: See Section 3.1, Common Update Processing.

> ***NOTE***: A proposed change concerns the process applied to a record that has a Chart Number equal to all 9s. The change would add a check of Year of Birth, Gender, and a list of known bad SSNs (e.g., Blank, all single digits, less than 9 digits).

Linking APC Visit Records to Patients

This program calls the *aapc_lnk* program to perform this linking process. See Section 3.1, Common Update Processing.

Determining Workload Reportability

The *npcc_upd* program now determines if the APC visit entry is workload reportable. This procedure applies to both a record that is overwritten by a new record (where the Patient_Id of the existing record is NOT used) and a record that is inserted as a new record. To be considered workload reportable, the APC visit record must not be a duplicate and must have the field values indicated below:

Cutoff Date:

If the fiscal year in the visit record date is equal to a fiscal year that has been set as the cutoff for this table for the region and if the record is a duplicate, the workload reportable flag is kept as it was set prior to receiving the record again (i.e., whatever the workload reportable flag is set to prior to receiving the duplicate visit is what it is set to after the visit is processed in order not to effect the workload reports). If the record is not a duplicate, the program flags the record as non-workload reportable. If a record is received after the cutoff date for the fiscal year in which the visit occurred, then the record will be flagged as non-workload reportable; otherwise, it continues checking the other workload reporting criteria for the record. A record can be inserted with the npcc_upd program and flagged as non-workload reportable due to its being received after the established cutoff date; however, this can be reversed once the user has run the separate linker program, which does not have cutoff logic implemented yet, and the workload flag is set to "Y."

Visit Type:

I = IHS
T = Tribe-Non-638/Non-Compact
O = Other
6 = Tribe-638 Program
P = Tribe-Compacted Tribal Program
U = Urban Clinic
? = Default value if the facility sends a value of blank or null for this field. ***NOTE***: This value is only defaulted for old format export files AND only when the type of visit is

known. We do NOT default this value for records on PCC that have either a blank value or a value not included in the above list.

Service Category:

A = Ambulatory
S = Day Surgery
O = Observation
? = Currently the default value if the facility sends a value of blank or null for this field. ***NOTE***: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

Location of Encounter:

The location of encounter (LOE) code must be valid; that is, it must be included in the Standard Code Book table, r_facility, maintained at NPIRS.

APC Facility.

The location of encounter code must have an APC_flag = "1" in the Standard Code Book table, r_facility, maintained at NPIRS, indicating that the facility is authorized to perform outpatient services and is maintained by HQ via updates to the SCB tables.

Clinic Code:

The program has hard-coded logic that checks for non-workload reportable clinic codes. Previously this program was allowing clinic codes 95 - 97 to be counted as workload reportable even though they weren't on the SCB table, r_clinic_codes. They weren't added until just recently, with an effective date of 01/01/01. ***Approved Change***: The clinic code must be in the Standard Code Book table, r_clinic_codes, maintained at NPIRS, and it must contain a workload reportable value = "Y."

Primary Provider Code:

The program has hard-coded program logic that checks for non-workload reportable provider codes. For any visit with a Date of Service on or prior to 09/30/99, it flags a blank Provider Code as workload reportable. For any visit with a Date of Service on or after 10/01/99, the Provider Code must be a number between 00 - 99. ***NOTE***: This process currently flags Provider Code values of A1 and A2 as non-workload reportable, which is inconsistent with the SCB table. ***Approved Change***: The provider code must be in the Standard Code Book table, r_provider_codes, and it must contain a workload reportable value = "Y."

The program inserts the record to the database, inserting the current date in the *row_create_date* field and inserting the date the record was moved to the Input_Files Table in the *source_date* field.

Inpatient Table Inserts

The *npcc_upd* program first determines if each Inpatient visit is a duplicate of a record already in the Inpatient Table; second, it attempts to link the visit to a patient; third, it determines if the visit in each record is workload reportable; and fourth, it then inserts the record to the table.

Determining and Handling Duplicate Records

The program determines whether or not an Inpatient visit is a duplicate and flags it accordingly as either "Y" or "N" using the following matching field criteria:

- ASUFAC
- Chart Number
- Admission Date
- Location of Encounter
- Discharge Date
- Duplicate Flag: See Section 3.1, Common Update Processing.

NOTE: A proposed change concerns the process applied to a record that has a Chart Number equal to all 9s. The change would add a check of Year of Birth, Gender, and a list of known bad SSNs (e.g., Blank, all single digits, less than 9 digits).

Linking Inpatient Visit Records to Patients

This program calls the *ninp_lnk.sqb* program to perform this linking process. See Section 3.1, Common Update Processing.

Determining Workload Reportability

The *npcc_upd* program now determines if the Inpatient visit is workload reportable. This procedure applies to both a record that is overwritten by a new record (where the Patient_Id of the existing record is NOT used) and a record that is inserted as a new record. To be considered workload reportable, the Inpatient visit record must not be a duplicate and must have the field values indicated below:

Cutoff Date:

If the fiscal year in the visit record date is equal to a fiscal year that has been set as the cutoff for this table for the region and if the record is a duplicate, the workload reportable flag is kept as it was set prior to receiving the record again (i.e., whatever the workload reportable flag is set to prior to receiving the duplicate visit is what it is set to after the visit is processed in order not to effect the workload reports). If the record is not a duplicate, the program flags the record as non-workload reportable. If a record is received after the cutoff date for the fiscal year in which the visit occurred, then the record will be flagged as non-workload reportable; otherwise, it continues checking the other workload reporting criteria for the record. A record can be inserted with the npcc_upd program and flagged as non-workload reportable due to its being received after the established cutoff date; however, this can be reversed once the user has run the separate linker program, which does not have cutoff logic implemented yet, and the workload flag is set to "Y."

Service Type:

I = IHS
T = Tribe-Non-638/Non-Compact
O = Other
6 = Tribe-638 Program
P = Tribe-Compacted Tribal Program
? = Currently the default value if the facility sends a value of blank or null for this field.
NOTE: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

Service Category:

H = Inpatient

? = Currently the default value if the facility sends a value of blank or null for this field. NOTE: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

The program inserts the record to the database, inserting the current date in the *row_create_date* field and inserting the date the record was moved to the Input_Files Table in the *source_date* field.

CHSINP Table Inserts

The *npcc.upd* program first determines if each CHS Inpatient visit is a duplicate of a record already in the CHSINP Table; second, it attempts to link the visit to a patient; third, it determines if the visit in each record is workload reportable; and fourth, it then inserts the record to the table.

Determining and Handling Duplicate Records

The program determines whether or not a CHS Inpatient visit is a duplicate and flags it accordingly as either "Y" or "N" using the following criteria:

If the Chart Number is not equal to all 9s, the program compares visits using the following field values:

- ASUFAC
- Chart Number
- Date of Admission
- Duplicate Flag: See Section 3.1, Common Update Processing.

If the Chart Number is equal to all 9s, the program compares visits using the SSN instead:

- ASUFAC
- SSN
- Date of Admission
- Duplicate Flag: See Section 3.1, Common Update Processing.

> ***NOTE***: A proposed change for a Chart Number equal to all 9s would add a check of Year of Birth, Gender, and a list of known bad SSNs (e.g., Blank, all single digits, less than 9 digits).

Linking CHS Inpatient Visit Records to Patients

This program calls the *nchi_lnk* program to perform this linking process. See Section 3.1, Common Update Processing.

Determining Workload Reportability

The *npcc_upd* program now determines if the CHS Inpatient visit is workload reportable. This procedure applies to both a record that is overwritten by a new record (where the Patient_ID of the existing record is NOT used) and a record that is inserted as a new record. To be considered workload reportable, the CHS Inpatient visit record must not be a duplicate and must have the field values indicated below:

Cutoff Date:

If the fiscal year in the visit record date is equal to a fiscal year that has been set as the cutoff for this table for the region and if the record is a duplicate, the workload reportable flag is kept as it was set prior to receiving the record again (i.e., whatever the workload reportable flag is set to prior to receiving the duplicate visit is what it is set to after the visit is processed in order not to effect the workload reports). If the record is not a duplicate, the program flags the record as non-workload reportable. If a record is received after the cutoff date for the fiscal year in which the visit occurred, then the record will be flagged as non-workload reportable; otherwise, it continues checking the other workload reporting criteria for the record. A record can be inserted with the npcc_upd program and flagged as non-workload reportable due to its being received after the established cutoff date; however, this can be reversed once the user has run the separate linker program, which does not have cutoff logic implemented yet, and the workload flag is set to "Y."

Service Type:

C = Contract
? = Currently the default value if the facility sends a value of blank or null for this field.

Service Category:

H = Hospitalization
? = Currently the default value if the facility sends a value of blank or null for this field. ***NOTE***: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

The program inserts the record to the database, inserting the current date in the *row_create_date* field and inserting the date the record was moved to the Input_Files Table in the *source_date* field.

CHSOUT Table Inserts

The *npcc.upd* program first determines if each CHS Outpatient visit is a duplicate of a record already in the CHSOUT Table; second, it attempts to link the visit to a patient; third, it determines if the visit in each record is workload reportable; and fourth, it then inserts the record to the table.

Determining and Handling Duplicate Records

The program determines whether or not a CHS Outpatient visit is a duplicate and flags it accordingly as either "Y" or "N" using the following criteria:

If the Chart Number is not equal to all 9s, the program compares visits using the following field values:

- ASUFAC
- Chart Number
- Date of Service
- Duplicate Flag: See Section 3.1, Common Update Processing.

If the Chart Number is equal to all 9s, the program compares visits using the SSN instead:

- ASUFAC
- SSN
- Date of Service

- Duplicate Flag: See Section 3.1, Common Update Processing.

> ***NOTE***: A proposed change for a Chart Number equal to all 9s would add a check of Year of Birth, Gender, and a list of known bad SSNs (e.g., Blank, all single digits, less than 9 digits).

Linking CHS Outpatient Visit Records to Patients

This program calls the *ncho_lnk.sqb* program to perform this linking process. See Section 3.1, Common Update Processing.

Determining Workload Reportability

The *npcc_upd* program now determines if the CHS Outpatient visit is workload reportable. This procedure applies to both a record that is overwritten by a new record (where the Patient_Id of the existing record is NOT used) and a record that is inserted as a new record. To be considered workload reportable, the CHS Outpatient visit record must not be a duplicate and must have the field values indicated below:

Cutoff Date:

If the fiscal year in the visit record date is equal to a fiscal year that has been set as the cutoff for this table for the region and if the record is a duplicate, the workload reportable flag is kept as it was set prior to receiving the record again (i.e., whatever the workload reportable flag is set to prior to receiving the duplicate visit is what it is set to after the visit is processed in order not to effect the workload reports). If the record is not a duplicate, the program flags the record as non-workload reportable. If a record is received after the cutoff date for the fiscal year in which the visit occurred, then the record will be flagged as non-workload reportable; otherwise, it continues checking the other workload reporting criteria for the record. A record can be inserted with the npcc_upd program and flagged as non-workload reportable due to its being received after the established cutoff date; however, this can be reversed once the user has run the separate linker program, which does not have cutoff logic implemented yet, and the workload flag is set to "Y."

Service Type:

C = Contract

? = Currently the default value if the facility sends a value of blank or null for this field. ***NOTE***: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

Service Category:

A = Ambulatory

S = Day Surgery

O = Observation

? = Currently the default value if the facility sends a value of blank or null for this field. ***NOTE***: This value is only defaulted for old format export files AND only when the type of visit is known. This value is NOT defaulted for records on PCC that have either a blank value or a value not included in the above list.

The program inserts the record or modifies the record in the database, inserting the current date in the *row_create_date* field and inserting the date the record was moved to the Input_Files Table in the source_date field.

3.3 Contract Health 2-Digit Update File Processing (bchs_upd)

As an update program, *bchs_upd* validates, edits, and performs simple conversions on three kinds of direct-export CHS visit records: Contract Inpatient, Contract Outpatient, and Contract Dental. This program queries the Input_Files Table on *ircsrv2* for a match on filenames that also have a null processing date. When it finds a match, it opens the file and breaks the CHS visit records into individual fields (e.g., ASUFAC, Chart #, etc.).

Record Edits For CHS Inpatient, Outpatient, and Dental Visits

The program then performs the edit(s) indicated below for each field listed:

1. **Gender Code**: The program converts a numeric entry to an alpha character; i.e., 1=M, 2=F or as it is on the record.

2. **Den_Type Field (Dental visit only):** The program sets the value in this field to 'K' to differentiate this record, once inserted to the Dental Table, as CHS Dental as opposed to dental visits exported via PCC.

3. **Date Validation**: The program validates all dates in each record as being valid calendar dates. Any date found to be invalid (e.g., month 13, blank field, 31 days in a 30-day month) is replaced with a default date of 1/1/5000.

4. **ADA Codes (Dental visit only)**: The record may contain up to 15 ADA codes. For each ADA code, there is also an ADA Unit field.

   - ADA Code: The program just stores this value.
   - ADA Units: The program edits this numeric entry to make it COBOL-readable.

5. **SSN**: If the SSN is not numeric, the program replaces it with spaces.

6. **Y2K Conversion**: The program converts all 2-digit years to 4 digits using the following logic: Shown below is the new logic inserted in May 2001 to all programs that process export files that use 2-digit years for date fields (i.e., they do not include the century). The logic shown below in the Original DOS Year column, the year represents the actual calendar year of the date of service, not the fiscal year.

Original DOS Year	Recoded DOS Year	Original DOB Year	Recoded DOB Year
97	1997	00-97	19XX
97	1997	98-99	18XX
98	1998	00-98	19XX
98	1998	99	18XX
99	1999	00-99	19XX
00	2000	00	20XX
00	2000	01-99	19XX
01	2001	00-01	20XX

01	2001	02-99	19XX
02	2002	00-02	20XX
02	2002	03-99	19XX

7. **Region Code**: Using the first 2 digits of the ASUFAC, the program retrieves this value from the r_area Table. If that table has a Region Code equal to '?', the program inserts a 'Z' (interpreted as 'Unknown') to the field.

8. **Alaska ASUFAC/Location of Encounter**: Every record from Alaska is converted to an Area Code of 35 if it arrives with an Area Code of 30, with one facility exception: If Facility 303101 comes in as 303101 on or beyond 1/1/99, it is converted to 353101. If this facility comes in as 353101 on or before 12/31/98, it is converted to 303101.

9. **ASUFAC/Location of Encounter**: The program inserts the ASUFAC on the visit record to the Location of Encounter field. The Location of Encounter value is not provided in these files and is needed for workload reporting purposes.

10. **Place of Injury**: The program converts the numeric entry to the alpha entry using a map hard-coded within the program.

11. **Charges**: The program stores the value in this field or inserts a zero if the field is blank.

12. **Full or Partial Payment**: The program stores the values in these fields or inserts a zero if the fields are blank.

13. **Service Type and Service Category**: The program defaults these fields to a '?' which makes the record workload reportable if the other criteria are met. The Type and Service Category values are not provided in these files and are needed for workload reporting purposes.

Determining and Handling Duplicate Records

The program determines whether or not the CHS visit (Inpatient and Outpatient) is a duplicate using the following criteria:

- ASUFAC
- Chart Number
- Admission Date (Inpatient visit), Date of Visit (Outpatient visit)
- Duplicate Flag: See Section 3.1, Common Update Processing.

> ***NOTE***: This program does not check CHS Dental visits for duplicates, it just inserts the records to the Dental table. The unduplication process is done on the Dental table separately.

Linking CHS Inpatient/Outpatient/Dental Visit Records to Patients

This program calls the *nchi_lnk, ncho_lnk, and dent_lnk* programs to perform this linking process on the corresponding visit types. The program first looks at the Chart Table to find the chart number on the record, regardless of what that chart number is. If it does not find it, the program then goes to the Patient Table to find the SSN on the record. If it does not find it there, the program does not link the visit to a patient.

Determining Workload Reportability

The following provider types are the only ones considered workload reportable for non-duplicate direct CHS visits.

Inpatient

GM&S Hosp	01
Psych Hosp	03
Long Term Care Hosp	04

Ambulatory (outpatient)

GM&S	01
Physician	05
Optometrist	06
Dentist	07 (code provided by Leslie Racine)
Pharmacy	12 (code provided by Leslie Racine)
All Other	16 (code provided by Leslie Racine
Chiropractor	17 (code provided by Leslie Racine)
NHSC Nurse Prac	18 (code provided by Leslie Racine)
NHSC Midwife	19 (code provided by Leslie Racine)

Insert/Modify

The program inserts all three record types into the database; it modifies only CHS Inpatient and Outpatient records in the data (i.e., CHS Dental is not checked for duplicates), inserting the current date in the Row Create Date field and inserting the date the record was moved to the Input_Files Table in the Source Date field.

3.4 Contract Health 4-Digit Update File Processing (bchs_Y2kupd)

The program, *bchs_Y2kupd*, processes the three kinds of direct-export CHS visit records (i.e., Contract Inpatient, Contract Outpatient, and Contract Dental) as described in **Section 3.2, 2-Digit Update File Processing** but without converting 2-digit dates to 4 digits.

3.5 Contract Health FI Update File Processing (nchsfi_upd)

The update program, *nchsfi_upd*, processes two kinds of CHS visit records: Contract Inpatient and Contract Outpatient (no Contract Dental). This program queries the Input_Files Table on *ircsrv2* for a match on filenames that are keyed in that also have a null processing date. When it finds a match, the program opens the file and breaks the CHS visit record into individual fields (e.g., ASUFAC, Chart #, etc.).

Record Edits For CHS Inpatient and Outpatient Visits

The program then performs the edit(s) indicated below for each field listed:

1. **Gender Code**: The program converts '1' and 'M' to 'M' and every other entry to 'F'.

2. **Date Validation**: The program validates all dates in each record as being valid calendar dates. Any date found to be invalid (e.g., month 13, blank field, 31 days in a 30-day month) is replaced with a default date of 1/1/5000.

3. **Region Code**: The program determines region using the first two characters of the ASUFAC and a mapping of Area to Region hard-coded in the program.

4. **Alaska ASUFAC/Location of Encounter**: Every record from Alaska is converted to an Area Code of 35 if it arrives with an Area Code of 30, with one facility exception: If Facility 303101 comes in as 303101 on or beyond 1/1/99, it is converted to 353101. If this facility comes in as 353101 on or before 12/31/98, it is converted to 303101.

5. **Place of Injury (Inpatient visit only)**: The program converts the numeric entry to the alpha entry using a map hard-coded within the program.

6. **Charges**: This value must be a valid numeric entry or the program terminates processing of this record.

7. **Full or Partial Payment**: This value must be a valid numeric entry or the program terminates processing of this record.

8. **Service Type and Service Category**: The program defaults these fields to a '?' which makes the record workload reportable if other criteria are met. The Type and Service Category values are not provided in these files and are needed for workload reporting purposes.

9. **Location of Encounter:** In the event Location of Encounter is not provided, is null or blank, the program sets a value in this field equal to the ASUFAC.

Determining and Handling Duplicate Records

The program determines whether or not the CHS visit (Inpatient and Outpatient) is a duplicate and flags it accordingly as either "Y" or "N" using the following criteria:

- ASUFAC
- Chart Number
- Admission Date (Inpatient visit), Date of Visit (Outpatient visit)
- Duplicate Flag: See Section 3.1, Common Update Processing.

Linking CHS Inpatient/Outpatient Visit Records to Patients

This program calls the *nchi_lnk, and ncho_lnk* programs to perform this linking process on the corresponding visit types. See Section 3.1, Common Update Processing Sequence.

Determining Workload Reportability

Every CHS-FI Inpatient and Outpatient visit is considered workload reportable. (The Service Type and Category fields in these records are set to "?," the default that is read by the update programs as workload reportable.) Every direct CHS Inpatient and CHS Outpatient visit is considered workload reportable unless the record is a duplicate record.

Insert/Modify:

The program inserts or modifies both record types in the database, inserting the current date in the Row Create Date field and inserting the date the record was moved to the Input_Files Table in the Source Date field.

3.6 CHS FI Dental Update File Processing (nfiden_upd)

The update program, *nfiden_upd*, inserts dental records in the Dental Table. It checks the r-denada Table to determine the total number of teeth worked on, based on the ADA code(s), and retrieves the ICD9 code. The notation " -1" is placed on the patient_id.

3.7 Dental Update File Processing (nden_upd)

The update program, *nden_upd*, updates the Dental Table and runs unduplication and linker programs. If this update program encounters an error, it writes to an error log (*nden_upd.log*) and sends an Email notification to the NPIRS Help Desk.

This program queries the Input_Files Table on *ircsrv2* for files containing "denrun" in the export filename and a null processing date. When it finds such a file, it inserts the record into the Dental Table.

Using the ADA code in the export file record, the program refers to the R_denada Table to determine the total number of teeth that were worked on and retrieves the appropriate ICD9 diagnosis code.

Determining and Handling Duplicates

The *nden_und* program, launched by the n*den_upd* program, determines whether or not a Dental visit is a duplicate and flags it accordingly as either "Y" or "N" using the following criteria:

- Region Code
- ASUFAC
- Chart Number
- Date of Service

NOTE: If the HRN is blank, the program checks the source file to see if it is 'denrununi' or 'denunicor'. If it is, the visit record is not checked for duplication nor is it linked to a patient, but it is inserted to the Dental Table with a blank Dup_flag which is then read as workload reportable.

Linking Dental Visit Records to Patients

This program calls the *dent_lnk* program to perform this linking process. See Section 3.1, Common Update Processing Sequence.

4. Generation of Workload Reports

There are several reports generated by Crystal Reports software from the DB2 tables populated by the update programs and available from the NPIRS website. The most widely used reports are those that are described in this section with flowcharts provided in Appendix C. A separate document will itemize the other reports generated by NPIRS, primarily by individual request.

1A (APC) Report

This is an annual report that totals all ambulatory patient care (APC) visits (i.e., Indian and non-Indian outpatient visits to IHS facilities only) by provider code and month of service. The report may be grouped by Area, Service Unit, or Facility with a designated region. However, within a designated region, the following should be true:

- Whether the report is grouped by Area, Service Unit, or Facility, the total number of outpatient visits for the entire region should be the same (i.e., Total Outpatient Visits of All Areas = Total Outpatient Visits of All Service Units = Total Outpatient Visits of All Facilities).

- Whether the report is grouped by Area, Service Unit, or Facility, the total number of primary care patient visits for the entire region should be the same (i.e., Total Primary Care Patient Visits of All Areas = Total Primary Care Patient Visits of All Service Units = Total Primary Care Patient Visits of All Facilities).

- The total number of outpatient visits for all Facilities within a Service Unit should equal the total number of outpatient visits for the Service Unit. The same is true for total number of primary care patient visits.

  Example: (Total Outpatient Visits, Facility #1-SU2010 + Total Outpatient Visits, Facility #2-SU2010 + Total Outpatient Visits, Facility #n-SU2010) = Total Outpatient Visits, Service Unit 2010

- The total number of outpatient visits for all Service Units within an Area should equal the total number of outpatient visits for the Area. The same is true for total number of primary care patient visits.

  Example: (Total Outpatient Visits, Service Unit #1-Area20 + Total Outpatient Visits, Service Unit #2-Area 20 + Total Outpatient Visits, Service Unit #n-Area 20) = Total Outpatient Visits, Area 20

Source of Data: APC table in the Area database on server 2, IRCSRV2 and the following reference Tables that are part of the reference database stored on IRCSRV2.

reference:r_provider_codes
reference:r_area,
reference:r_service_unit
reference:r_facility

Report Flowchart: See Appendix C.

1A (APC - Indian Only) Report

This is an annual report that totals Indian-only ambulatory patient care (APC) visits (i.e., Indian outpatient visits to IHS facilities only) by provider code and month of service. This report may be grouped by Area, Service Unit, or Facility with a designated region. However, within a designated region, the following should be true:

- Whether the report is grouped by Area, Service Unit, or Facility, the **total number of outpatient visits** for the entire region should be the same (i.e., Total Outpatient Visits of All Areas = Total Outpatient Visits of All Service Units = Total Outpatient Visits of All Facilities).

- Whether the report is grouped by Area, Service Unit, or Facility, the **total number of primary care patient visits** for the entire region should be the same (i.e., Total Primary Care Patient Visits of All Areas = Total Primary Care Patient Visits of All Service Units = Total Primary Care Patient Visits of All Facilities).

- The total number of outpatient visits for **all Facilities within a Service Unit** should equal the total number of outpatient visits for the Service Unit. The same is true for total number of primary care patient visits.

  Example: (Total Outpatient Visits, Facility #1-SU2010 + Total Outpatient Visits, Facility #2-SU2010 + Total Outpatient Visits, Facility #n-SU2010) = Total Outpatient Visits, Service Unit 2010

- The total number of outpatient visits for **all Service Units within an Area** should equal the total number of outpatient visits for the Area. The same is true for total number of primary care patient visits.

  Example: (Total Outpatient Visits, Service Unit #1-Area 20 + Total Outpatient Visits, Service Unit #2-Area 20 + Total Outpatient Visits, Service Unit #n-Area 20) = Total Outpatient Visits, Area 20

Source of Data: APC table in the Area database on server 2, IRCSRV2 and the following reference Tables that are part of the reference database stored on IRCSRV2.

reference:r_provider_codes
reference:r_area,
reference:r_service_unit
reference:r_facility
reference:r_tribe

Report Flowchart: See Appendix C.

1C (APC--All) Report

This is an annual report that totals all ambulatory patient care (APC) problems/clinic impressions (diagnosis recodes) for each visit (i.e., Indian and non-Indian outpatient visits to IHS facilities only) for a designated region by gender, problem/clinic impression, and by age. The report is sorted by Problem/Clinic Impression, Gender, and Age. Each individual problem/ clinic impression is

summed by gender and age. Hierarchical sums by gender and age are shown by problem/clinic impression, diagnosis recode class and region groupings.

Source of Data: APC table in the individual region databases on server 2, IRCSRV2 and the following reference Tables that are part of the Reference database stored on IRCSRV2:

reference:r_area
reference:r_service_unit
reference:r_facility
reference:r_apc_codes
reference:r_apc_recode_class

Report Flowchart: See Appendix C.

2A (Inpatient) Report

This report is used to report on Inpatient discharges and consultations. The discharges are patient dispositions by type of service.

- Dispositions are by regular discharges, transfers, irregular discharges, death within 48 hours, or death after 48 hours.
- Each type of disposition summarizes the number of the disposition type, average length of stay for that disposition type, and the number of consultations.

The type of service's disposition types are further categorized by age. Totals are by total dispositions for each type of service and also subtotaled by age.

- Ages are grouped by under 15 years, over 15 years, and unknown.

Summary totals are displayed by area.

Source of Data: Inpatient table on server 2, IRCSRV2 and the following tables that are part of the Reference database stored on IRCSRV2:

r_facility
r_service_unit
r_area
r_clinic_serv_cd

Report Flowchart: See Appendix C.

2C (Inpatient) Report

This report is used to report on Inpatient hospital discharges by admission diagnosis. The discharges are sorted by admission diagnosis and age groups. The diagnoses are IHS recodes further sorted by:

- Age groups of under 27 days, under 1 year, 1-4 years, 5-9 years, 10-14 years, 15-19 years, 20-24 years, 25-44 years, 45-64 years, over 65 years, and unknown.

- For each age group within the diagnosis, the sum of the number of discharges, total lengths of stay in days, and average length of stay are displayed.

Summary totals are displayed by diagnosis and by the area.

Source of Data: Inpatient table on server 2, IRCSRV2 and the following tables that are part of the Reference database stored on IRCSRV2:

r_facility
r_service_unit
r_area
r_inp_recode
r_inp_recode_class

Report Flowchart: See Appendix C.

3A (CHS Outpatient) Report

This report is used to display contract health outpatient visits for the Area broken down by sex, diagnosis, and age group.

Source of Data: The CHSOUT Table and the following reference tables are used in generating this report:

r_facility
r_service_unit
r_area
r_apc_codes
r_apc_record_class

Report Flowchart: See Appendix C.

3G (CHS Inpatient) Report

This report is used to display contract health inpatient hospitalization discharges and amounts charged for specific areas and service units. It statistically shows the number of discharges, number of days, and average length of stay for each hospital type.

Source of Data: The CHSINP Table and the following reference tables are used in generating this report:

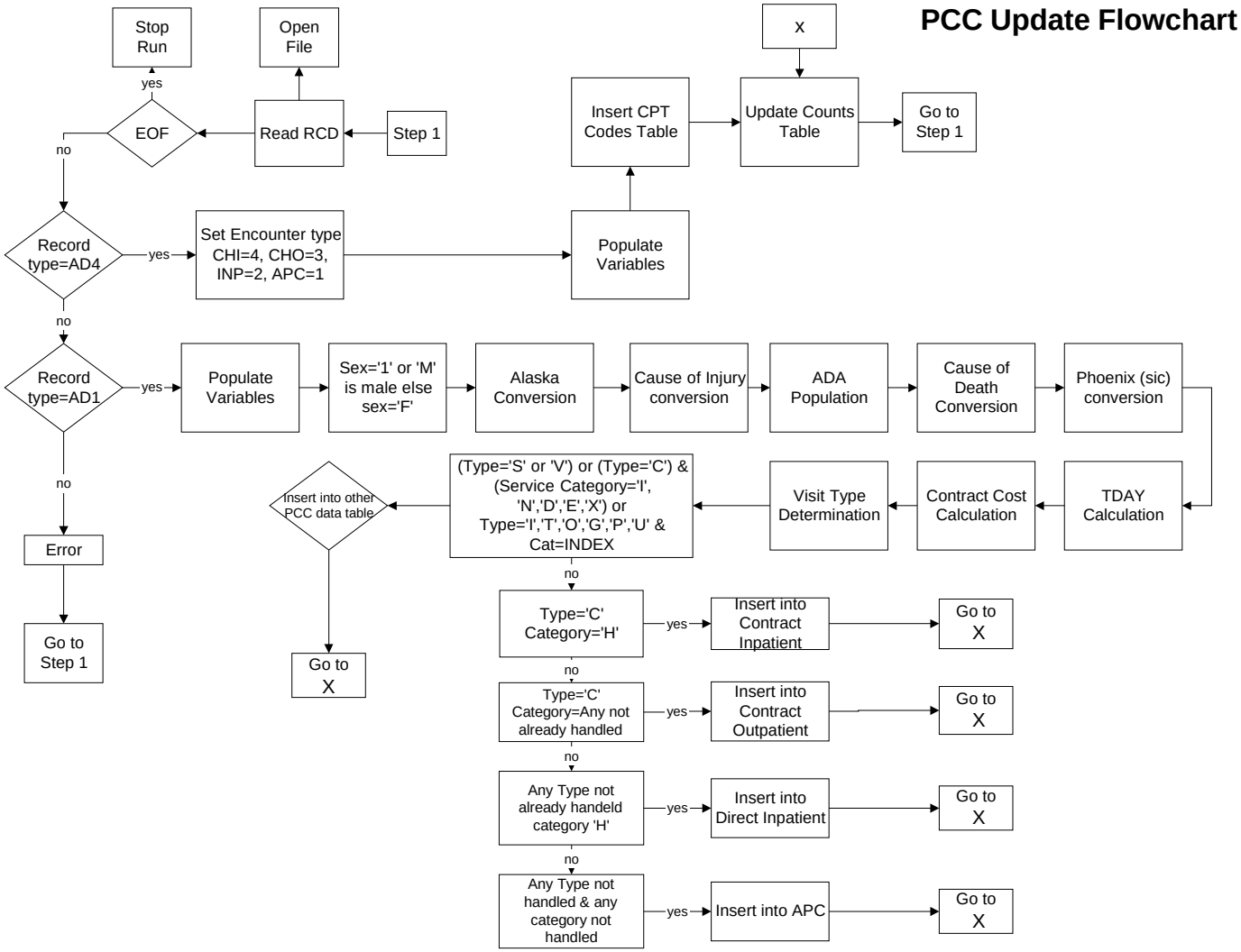
r_facility
r_service_unit
r_area
r_chs_prov_type

Report Flowchart: See Appendix C.

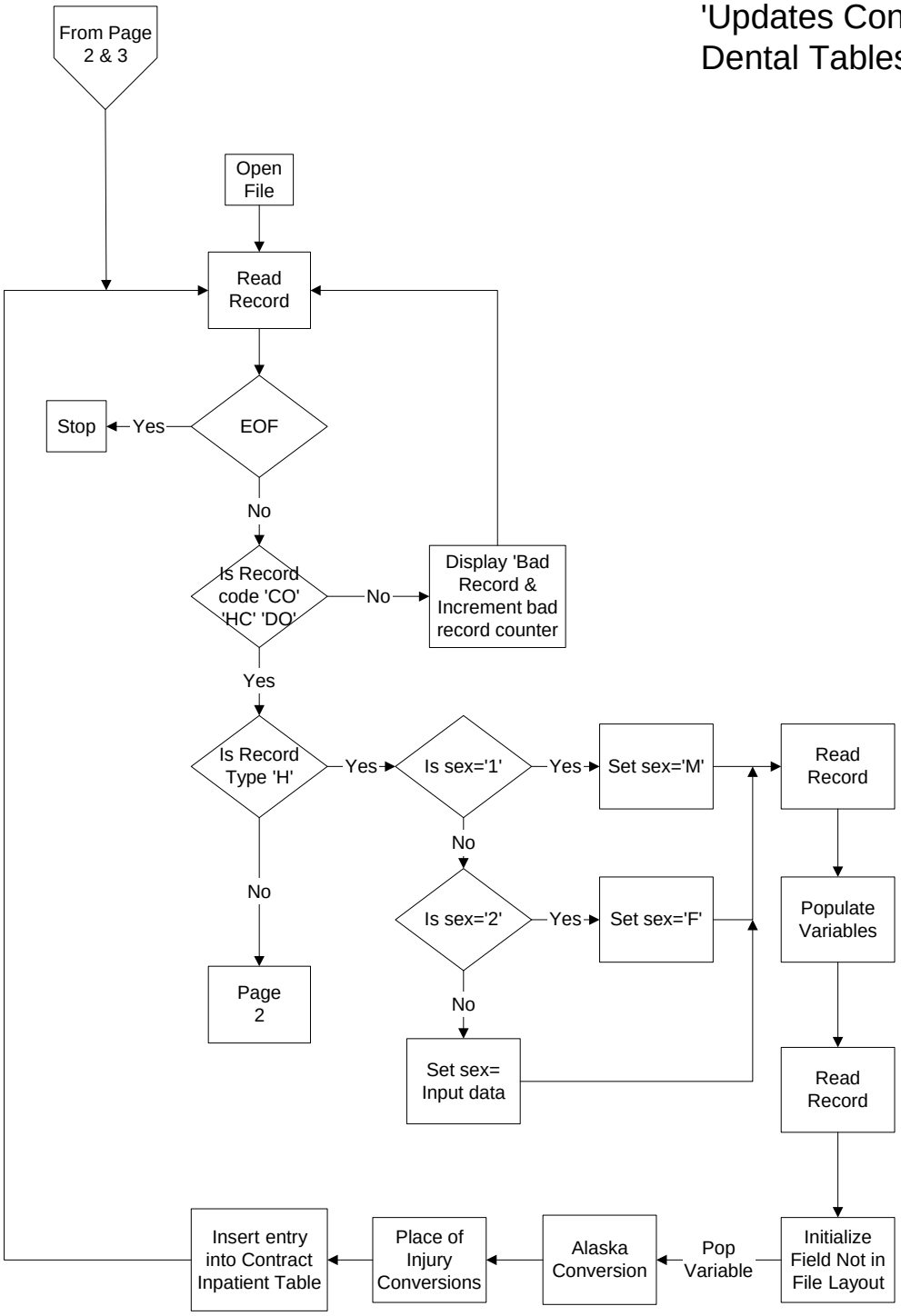
5. Limitations and Recommendations

None identified at the time of this writing. Approved changes to workload criteria are indicated in the sections of this document that describe the criteria by visit type.

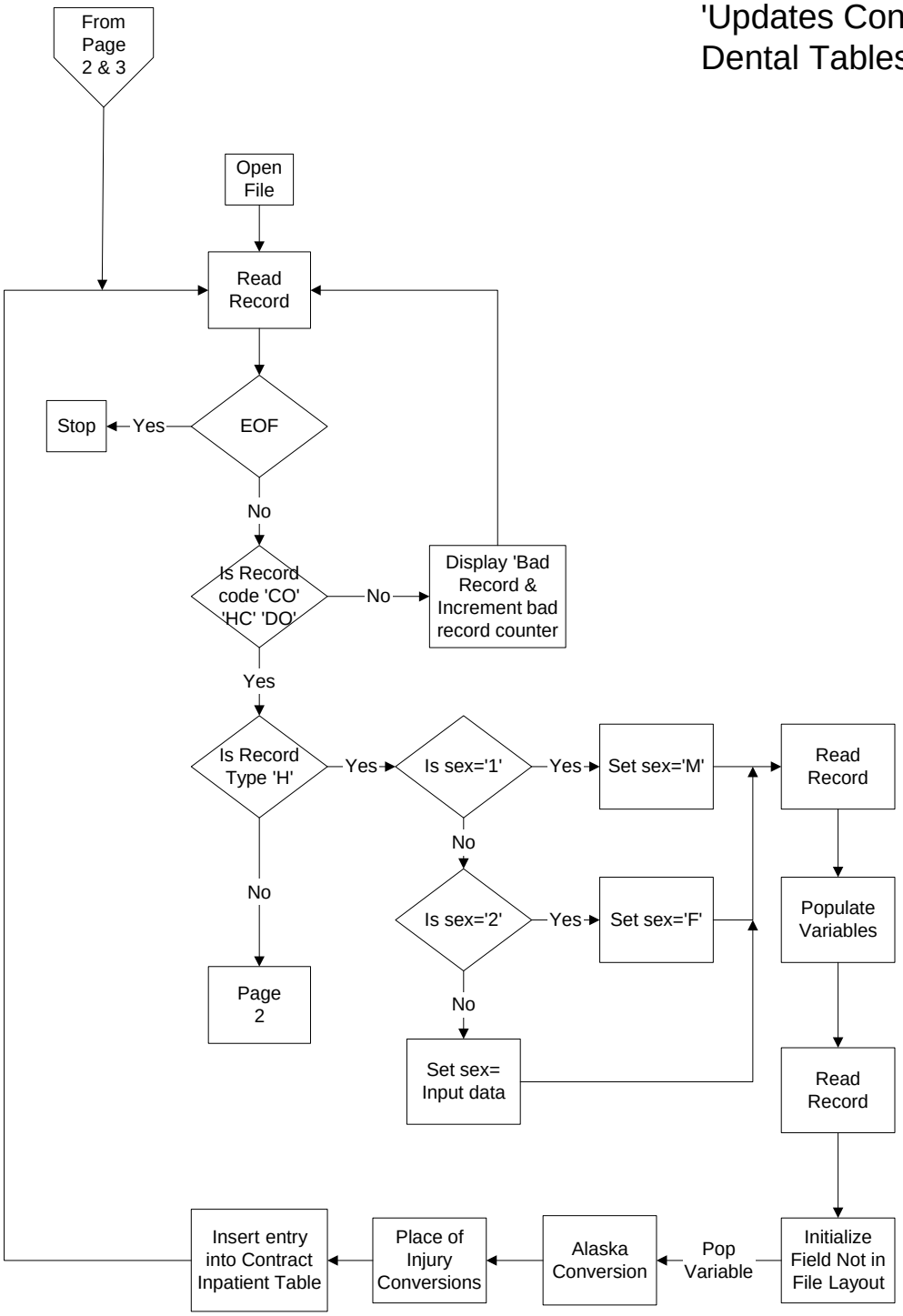
Appendix A: Export File Processing Flows

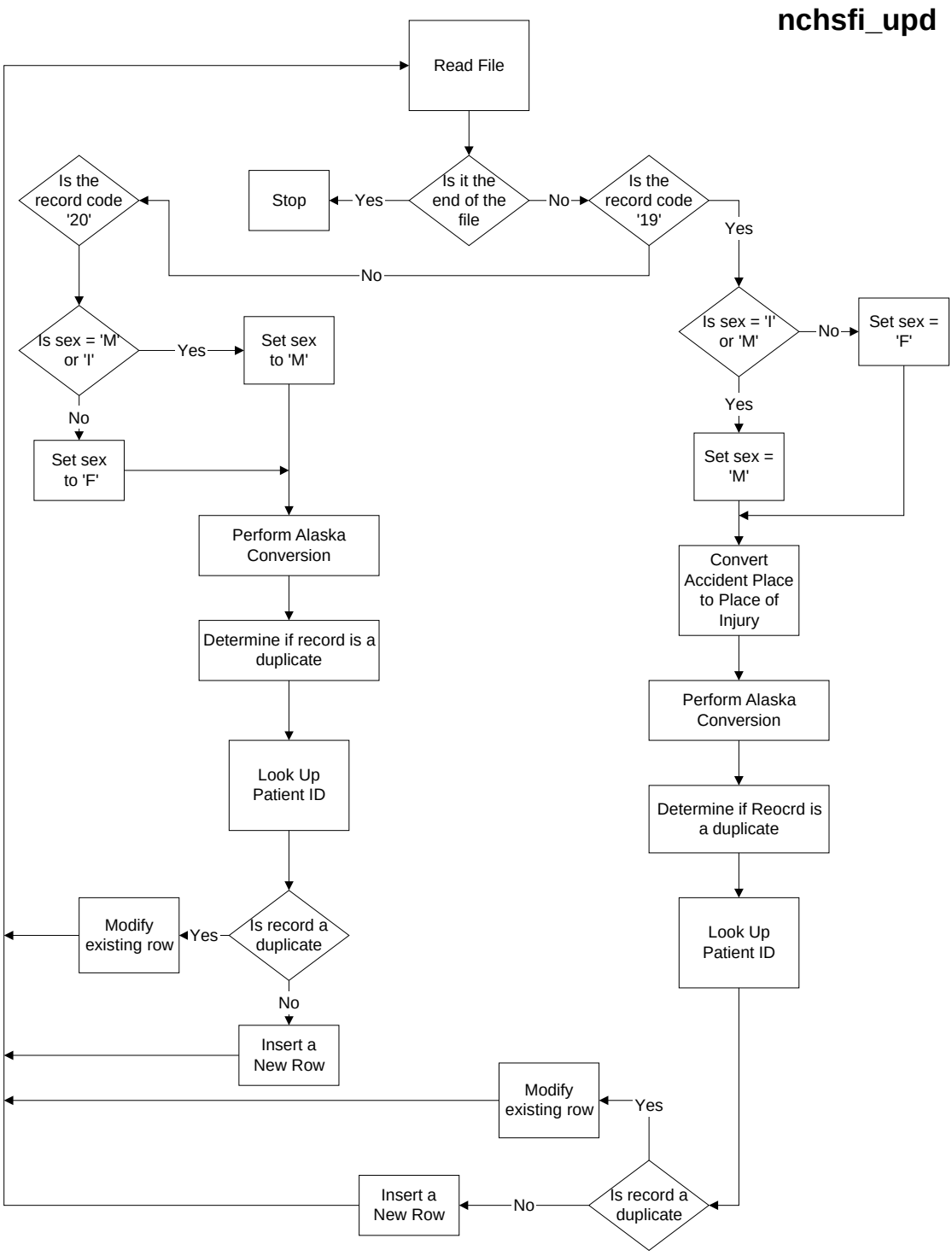


bchs_upd
'Updates Contract & Dental Tables'



bchs_Y2Kupd
'Updates Contract & Dental Tables'




nchsfi_upd
Read File
Is it the end of the file
Stop
Yes
No
Is the record code '19'
Yes
Is the record code '20'
No
Is sex = 'M' or 'I'
Yes
Set sex to 'M'
No
Set sex to 'F'
Perform Alaska Conversion
Determine if record is a duplicate
Look Up Patient ID
Is record a duplicate
Yes
Modify existing row
No
Insert a New Row
Is sex = 'I' or 'M'
No
Set sex = 'F'
Yes
Set sex = 'M'
Convert Accident Place to Place of Injury
Perform Alaska Conversion
Determine if Reocrd is a duplicate
Look Up Patient ID
Modify existing row
Yes
Is record a duplicate
No
Insert a New Row

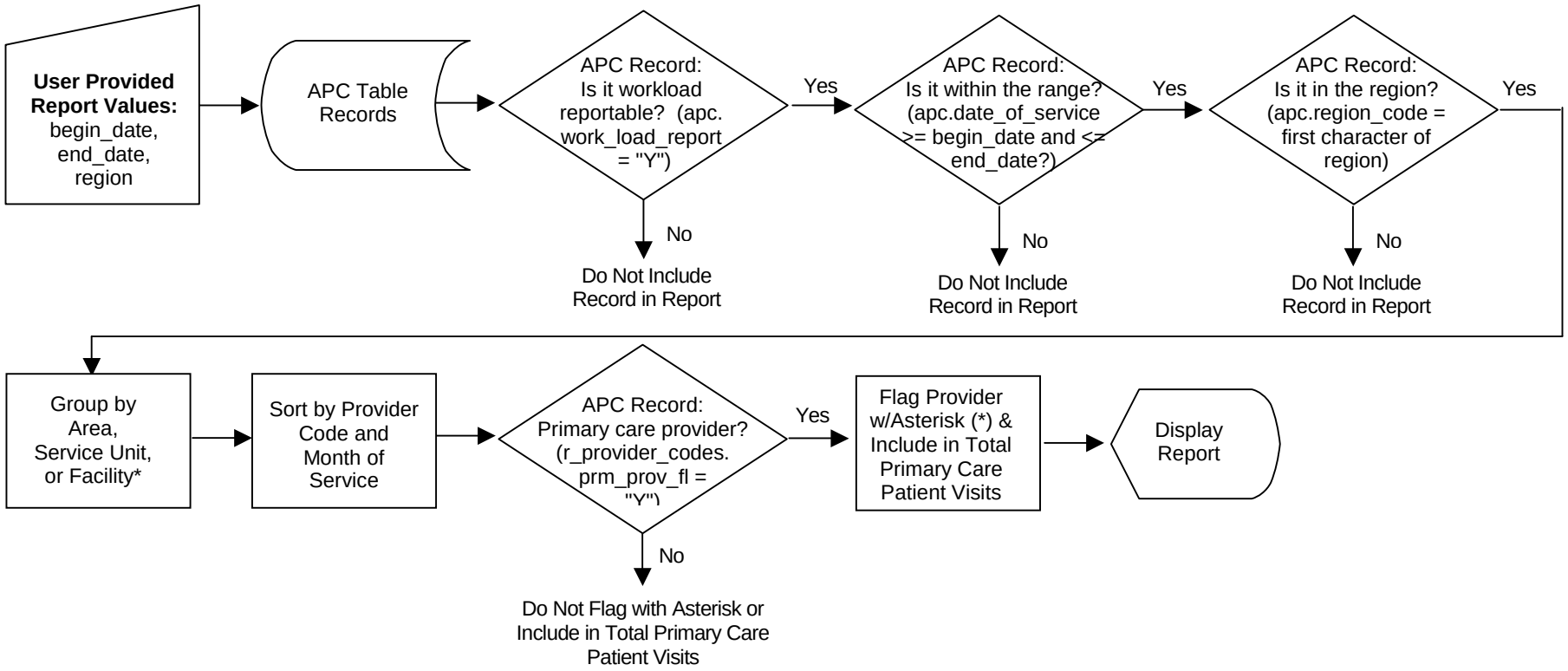
Appendix B: Table Insertion Matrix

Type	Service	Table Record is Inserted To/Updated / Comments	Insert into Table					
			APC	INPAT	CHSOUT	CHSINP	OTHER_PCC_DATA	PHN
V	ANY (A, H, I, C, T, N, S, O, E, R, D, X)	Veteran's Administration visits.					X	
C	H	Contract Inpatient				X		
	A, I, C, T, N, S, O, E, R, D, X	Contract Outpatient			Insert A, S, O Insert C, T, R but flag as non-wkload rpt		I, N, E, D, X	
S	ANY (A, H, I, C, T, N, S, O, E, R, D, X)	State visits.					X	
I, T, O, 6, P, U	A	Direct APC (ambulatory) visits.	X					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
	H	Direct Inpatient visits.		X				
	I	Direct in-hospital visits					X	
	C	Direct chart review.	X (Insert but flag as non-wkload rpt)					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
	T	Direct telecommunications.	X (Insert but flag as non-wkload rpt)					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
I, T, O, 6, P, U	N	Direct patient not found at home visit.					X	X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)

Type	Service	Table Record is Inserted To/Updated / Comments	Insert into Table					
			APC	INPAT	CHSOUT	CHSINP	OTHER_PCC_DATA	PHN
	S	Direct day surgery visit.	X					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
	O	Direct observation visit.	X					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
	E	Direct event.					X	
	R	Direct nursing home visit.	X (Insert but flag as non-wkload rpt)					X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)
	D	Direct daily hospitalization data.					X	
	X	Direct ancillary package daily data.					X	
Blank or any value not listed above	Blank or any value not listed above	This would be for records on the PCC statistical record that do not have a value for Type and/or Service Category. In this case, it is not known what type of visit this is. Decision made March 15, 01 to implement this logic into our PCC update programs and has not been done yet.					X	
Blank	Blank	For records on exports NPIRS receives directly from the Tribes who do not send their data to the Area Office and which use the old format exports (which do not include Type and Service Category fields), where it is known what type of data is being exported, such as direct APC, CHS inpatient, etc., we default both the Type and Service Category values to "?" and the visit may be workload reportable if it meets the other workload reporting criteria for that type of visit.	X	X	X	X		X (done with extract script run manually and only for Primary Prov Codes = 13 or 32)

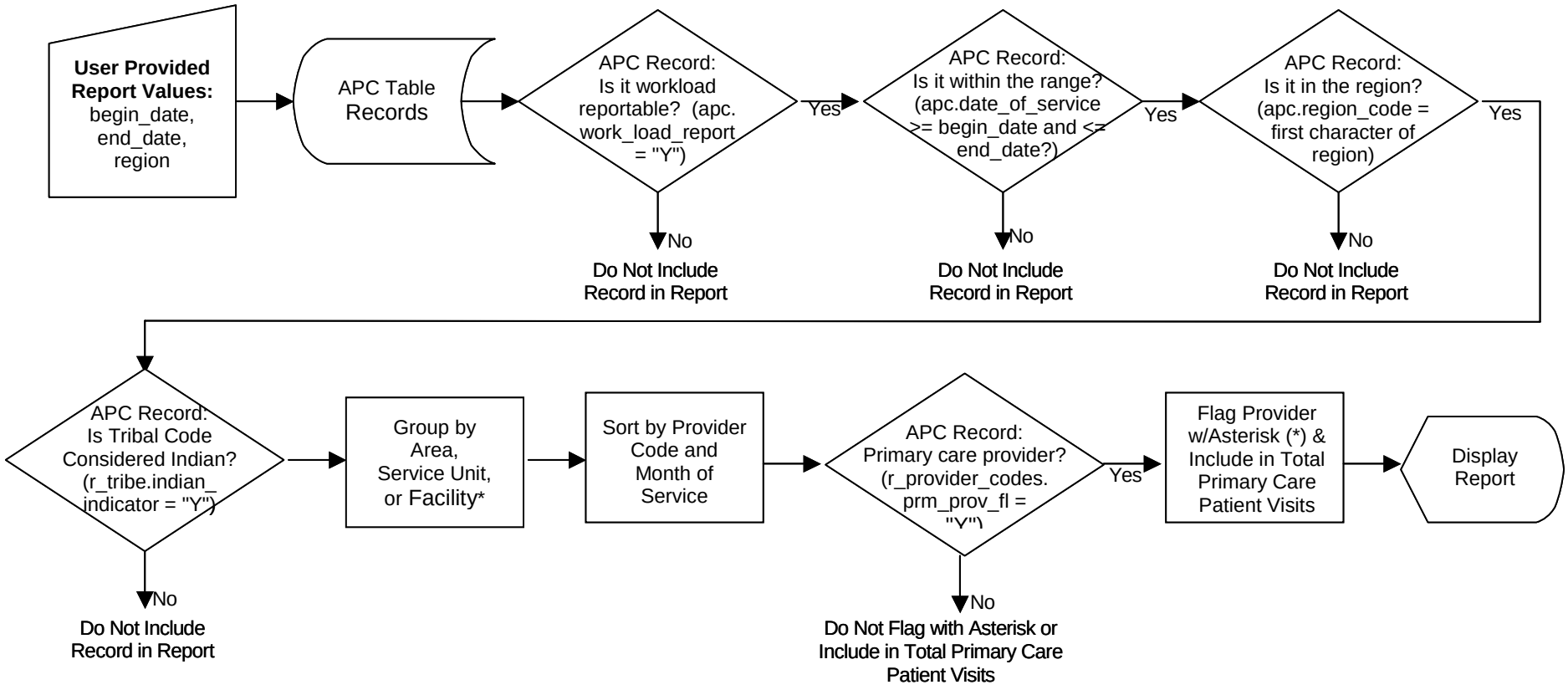
Appendix C: Crystal Reports Flowcharts

1A (APC) Report



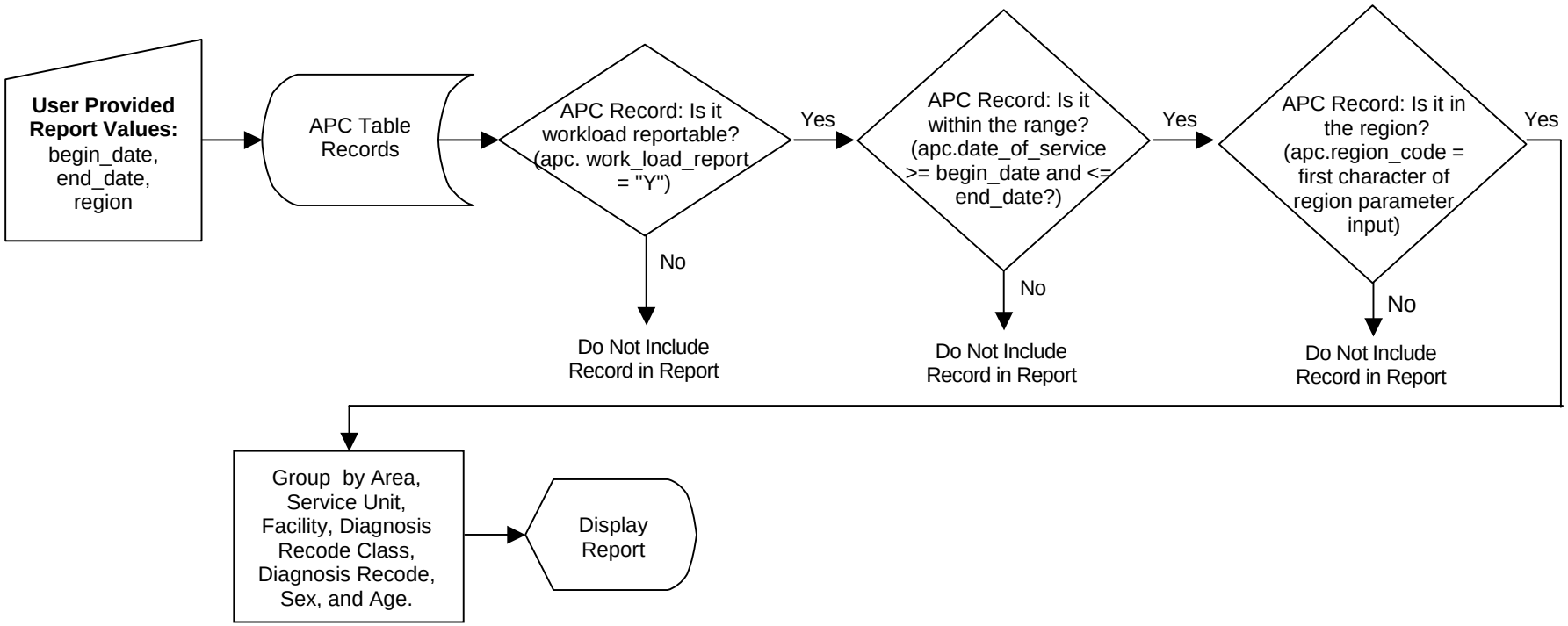
* Depends on user's selection

1A (APD - Indian Only) Report

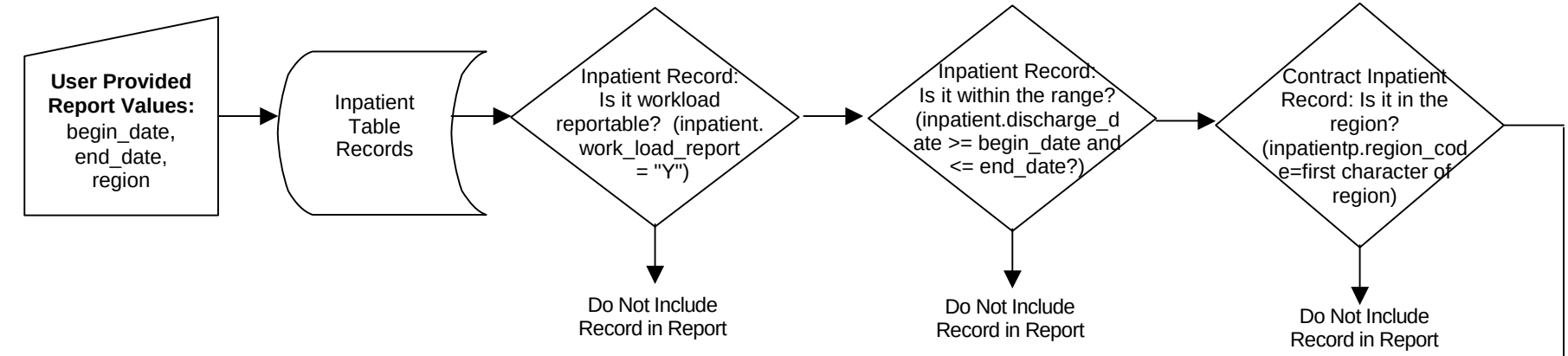


* Depends on user's selection.

1C (APC) Report

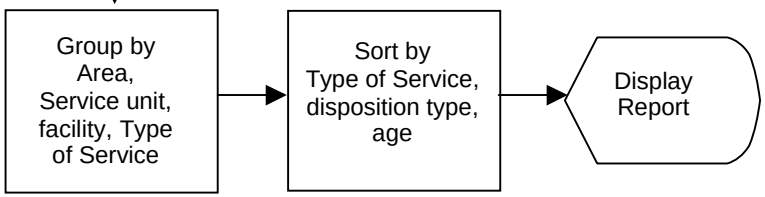


2A (Inpatient) Report



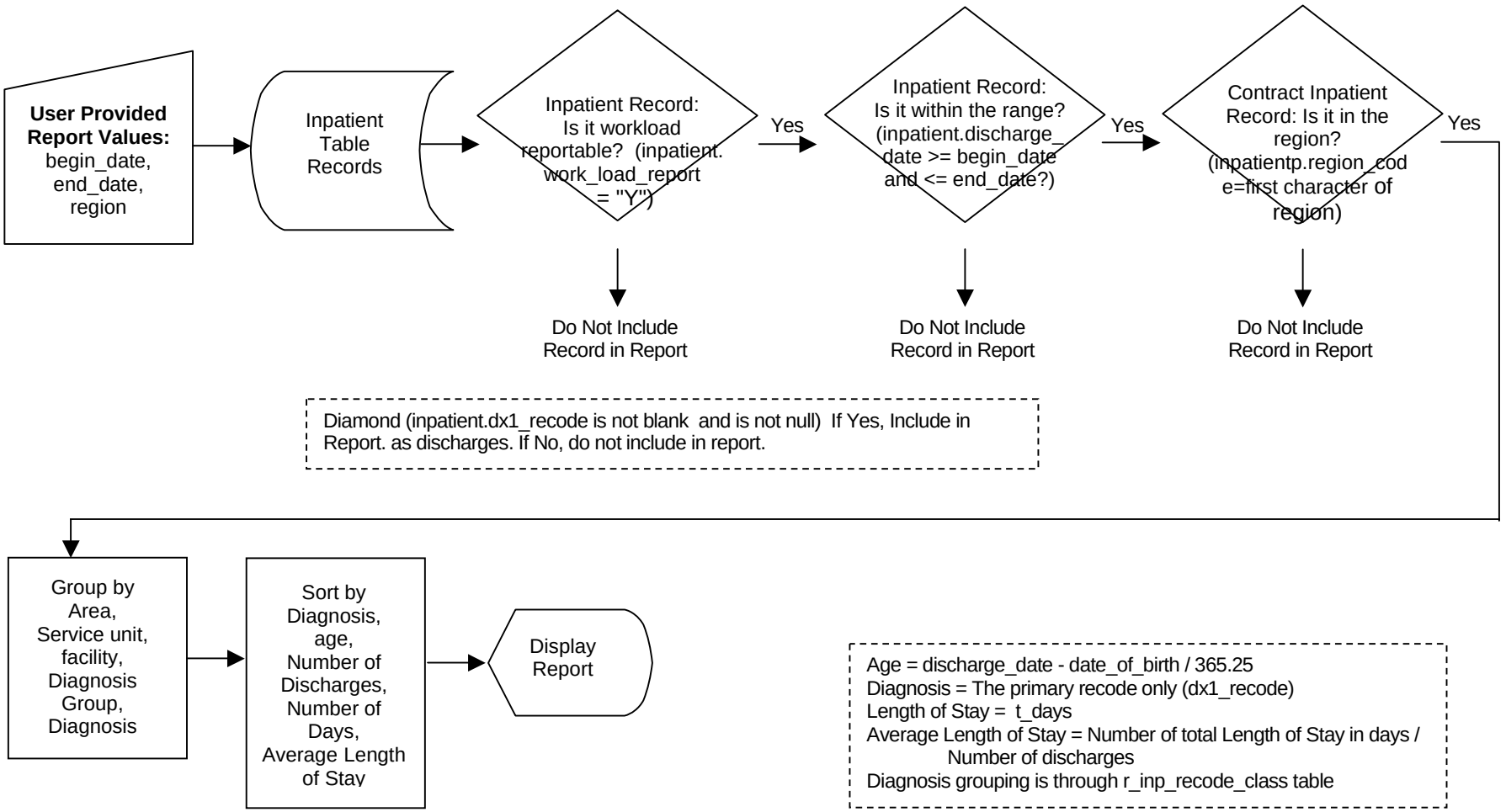
Diamond (inpatient.disposition_code = "0", "1", "8", "9" , is blank or is null) If Yes, Include in Report as discharges. If No, go next diamond.
Diamond (inpatient.disposition_code = "2") If Yes, Include in Report as transfer. If No, go next diamond.
Diamond (inpatient.disposition_code = "3") If Yes, Include in Report as irregular discharge. If No, go next diamond.
Diamond (inpatient.disposition_code = "4" or "5") If Yes, Include in Report as death within 48 hours. If No, go next diamond.

Diamond (inpatient.disposition_code = "6" or "7") If Yes, Include in Report as death after 48 hours. If No, do not include in report.

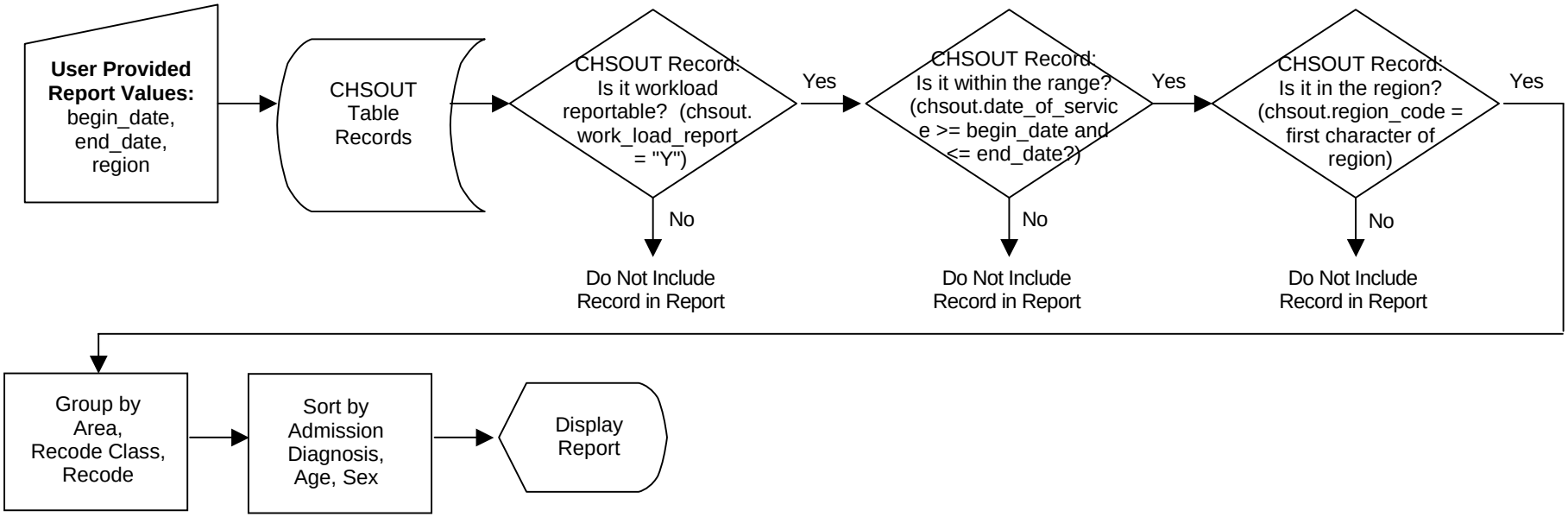


Age = discharge_date - date_of_birth / 365.25
Type of Service = clinic_code
Disposition types = disposition_code

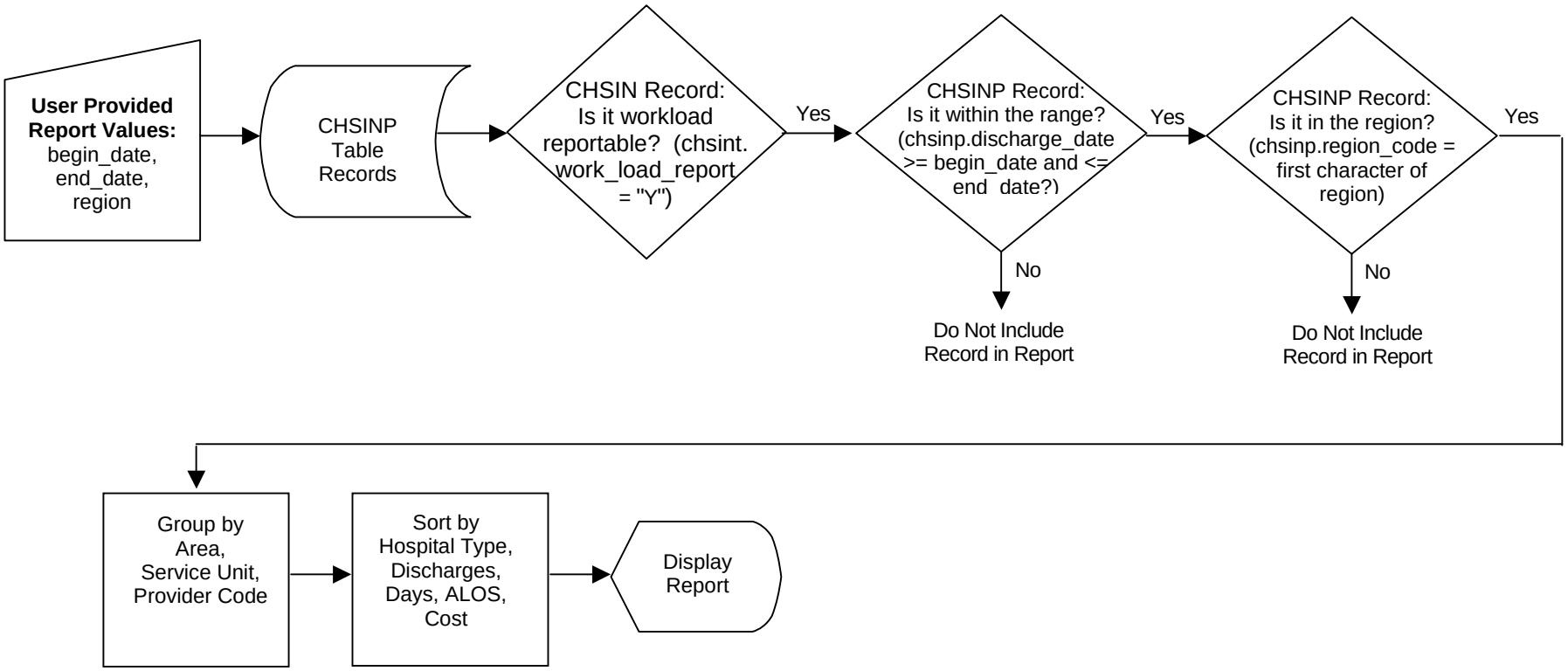
2C (Inpatient) Report



3A (CHS Outpatient) Report



3G (CHS Inpatient) Report



Glossary

ASUFAC	A visit transaction identifier consisting of the Area (A), Service Unit (SU), and Facility identifier (FAC) used in matching patients to visits. Same as facility code.
Active Patient	A patient who has had at least one visit during a selected fiscal year or the two years preceding it.
Chart Number	Identifier of an individual's medical record at a facility.
CHS	Contract Health System visit data.
Default Date	The update programs validate dates in the data and change any found to be invalid (e.g., Feb 30) or imprecise (00/00/1909) to a default of 01/01/5000.
Facility	A 6-digit designator for a location. Same as ASUFAC
Health Record Number	A 12-digit number created by concatenating ASUFAC and Chart Number.
Patient ID	A 9-character designator assigned by NPIRS, via the Registration Update Module, to uniquely identify a patient within a region; created by combining the ASUFAC pseudocode and Chart Number fields.
Region	One of 12 geographical divisions of the IHS; each is comprised of up to 4 Areas (IHS, non-IHS, urban, tribal) represented by the first 2 digits of the 6-digit ASUFAC
RPMS	Resource and Patient Management System, an IHS suite of software applications that support the provision of health care and billing for those services.
Workload Reportable	Refers to visits that are determined to be valid according to criteria defined by visit type